Manifestations of Poverty and Birthrates Among Young Teenagers in California Zip Code Areas

By Douglas Kirby, Karin Coyle and Jeffrey B. Gould

Context: *Given that many communities are implementing community-wide initiatives to reduce teenage pregnancy or childbearing, it is important to understand the effects of a community's characteristics on adolescent birthrates.*

Methodology: *Data from the 1990 census and from California birth certificates were obtained for zip codes in California. Regression analyses were conducted on data from zip code areas with at least 200 females aged 15–17 between 1991 and 1996, to predict the effects of race and ethnicity, marital status, education, employment, income and poverty, and housing on birthrates among young teenagers.*

Results: *In bivariate analyses, the proportion of families living below poverty level within a zip code was highly related to the birthrate among young teenagers in that zip code (r=.80, p<.001). In multivariate analyses, which controlled for some of the correlates of family poverty level, the proportion of families living below poverty level remained by far the most important predictor of the birthrate among young teenagers (b=1.54), followed by the proportion of adults aged 25 or older who have a college education (b=–0.80). Race and ethnicity were only weakly related to birthrate. In all three racial and ethnic groups, poverty and education were significantly related to birthrate, but the effect of college education was greater among Hispanics (b=–2.98) than among either non-Hispanic whites (b=–0.53) or blacks (b=–1.12). Male employment and unemployment and female unemployment were highly related to the birthrate among young teenagers in some racial or ethnic groups, but not in others.*

Conclusions: *Multiple manifestations of poverty, including poverty itself, low levels of education and employment, and high levels of unemployment, may have a large impact upon birthrates among young teenagers. Addressing some of these issues could substantially reduce childbearing among young adolescents.*

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Reducing birthrates among teenagers—especially young teenagers—is an important national goal, because childbearing within this age-group is linked to a variety of negative consequences for adolescent mothers, their infants and society at large.[1] To design more effective interventions for reducing childbearing among the young, policymakers, program developers and adults working with youth need an adequate understanding of the factors associated with childbearing within this age-group.

Researchers have examined the relationship between individual characteristics and measures of sexual activity, contraceptive use, pregnancy and childbearing.[2] Their findings have demonstrated that a wide range of antecedents are related to teenage sexual risk-taking and childbearing, and have helped professionals develop more effective programs.

However, the overall concern is with reducing childbearing among groups of teenagers or among all teenagers, not with decreasing it among certain individuals. Thus, research is needed to understand not just the relationship between individual characteristics and rates of childbearing among younger adolescents, but also the associations between community characteristics and levels of teenage fertility. This is especially the case because researchers, policymakers and program developers are increasingly interested in community-based efforts to reduce adolescent pregnancy and childbearing.

Previous studies have found that community characteristics have an impact upon adolescent sexual behavior, pregnancy and childbearing. For example, rates of pregnancy or childbearing have been found to be related to such factors as the level of unemployment,[3] community income,[4] opportunities for a future,[5] measures of community stress[6] and the crime rate.[7] In general, these studies have found that "a paucity of economic resources, racial segregation and social disorganization seem to provide young people with little motivation to avoid behaviors with potentially deleterious consequences, such as unprotected intercourse and a consequent nonmarital birth."[8]

In addition, studies have found that youth initiate sexual intercourse at an earlier age when they live in communities where adults have low levels of college education[9] and higher divorce rates,[10] where rates of residential turnover are high,[11] where the rates of women working full-time (as opposed to part-time) are high,[12] where unemployment rates are high,[13] where family income is low,[14] where crime rates are high[15] and where there is less neighborhood monitoring by adults within the community.[16] One study also found that youth in neighborhoods with higher overall quality were more likely than youth in low-quality neighborhoods (e.g., ghettos) to practice contraception when they did have sex.[17]

These and other studies have defined community poverty in quite different ways. Narrowly, community poverty can be defined simply as a low level of family income within a community. Broadly, it can include not only financial poverty but also all of the community characteristics that are often associated with poverty (e.g., poor schools, low levels of education, high unemployment, overcrowded and dilapidated housing, high rates of divorce, concentrations of single mothers, family dysfunction, high crime rates and low levels of social capital).

We present here additional, more recent evidence on the relationship between teenage birthrates and community poverty and other community characteristics. We examine the simple relationship between adolescent birthrates and community poverty broadly defined, and then report on the relative importance of some of its manifestations, as well as on other community characteristics. We also describe the relationships between ethnic-specific community char-

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Table 1. Mean value (and standard deviation) of selected characteristics, and bivariate analysis of relationship between these characteristics and birthrate among females aged 15–17, all within selected California zip codes.

Characteristic	Mean (SD)	Bivariate relationships		
		r	b	p
Birthrate				
Per 1,000 females aged 15–17	43.4 (26.4)	na	na	na
Income/poverty				
% of population living below poverty level	13.4 (8.9)	.802	2.38	.000
Median household income (in $000s)	36.2 (12.7)	–.718	–1.49	.000
% of households receiving public assistance	10.9 (7.1)	.754	2.80	.000
% of households with family income >$150,000	2.3 (4.1)	–.469	–3.03	.000
Educational level*				
% with college degree	27.5 (13.8)	–.749	–1.44	.000
% with high school diploma but no college	22.8 (5.2)	.049	0.25	.092
Employment†				
% of males employed	69.4 (9.6)	–.377	–1.04	.000
% of females employed	52.4 (8.8)	–.576	–1.74	.000
% of males unemployed	5.5 (2.5)	.752	7.81	.000
% of females unemployed	4.2 (2.0)	.686	8.96	.000
% of females in armed forces	0.2 (1.0)	–.066	–1.78	.023
Ethnicity				
% black	8.0 (13.4)	.360	0.71	.000
% Hispanic	28.6 (22.6)	.664	0.78	.000
% non-Hispanic white	53.2 (27.6)	–.676	–0.65	.000
Female marital status				
% never married‡	24.3 (6.8)	.401	1.56	.000
% never married§	64.9 (10.0)	–.072	–0.19	.013
% divorced‡	9.4 (3.0)	.138	1.23	.000
Housing				
% of households owned with >1 person/room	7.7 (7.0)	.607	2.29	.000
% of households rented with >1 person/room	16.3 (9.8)	.714	1.93	.000

*Among those aged ≥25. †Among those aged ≥16. ‡Among those aged ≥15. §Among those aged 15–25. *Notes:* Statistics are provided for zip codes with at least 200 females aged 15–17 during the 1991–1996 period. The mean, standard deviation and bivariate correlations are weighted proportional to the number of 15–17-year-old females living in the zip code during the time period. na=not applicable. SD=standard deviation. r=bivariate correlation. b=unstandardized regression coefficient. p=probability value.

acteristics and birthrates among non-Hispanic whites, blacks and Hispanics. The analyses are based upon data from zip code areas in California with a certain minimum number of adolescent births.

The study described in this article is entirely exploratory. In fact, the results presented here are tangential to the focus of the original study. They emerged as we conducted analyses for another purpose, but we believed that the strength of some of the associations and the public interest in them warranted reporting them here.

Methods

Study Sample

We obtained data for all 1,811 county zip code areas (henceforth called "zip codes") in the state of California for which any teenage births had been recorded between 1991 and 1996. We excluded all zip codes that did not have at least 200 females aged 15–17 between 1991 and 1996 (i.e., a mean of 33 females aged 15–17 per year). With this approach, the same female may have been counted up to three times (that is, at 15, 16 and 17) during this six-year period. The final sample included 1,192 zip codes.

Measures

Our dependent variable was the mean of the annual birthrates for 15–17-year-old females during the period 1991–1996 for each zip code (hereafter called "young-teenage birthrates"). We selected this age-group because most youths in it are (or should be) in high school and few are married. Moreover, for them, the consequences of childbearing are typically more negative than they are for older adolescents, most of whom are out of high school, some of whom may be married and some of whom may have planned their pregnancy. We chose the 1991–1996 time period because it included multiple years of data to smooth out annual fluctuations, it excluded the years 1990 and before (and thus prevented the birthrates from having an impact upon the census data), and it included the last six years for which data were available when our analyses were begun.

Age-specific birth data by race and ethnicity were taken from California birth certificate files, with the zip code of the mother's residence used as the basic unit of analysis. Using yearly updated population estimates of the 1990 census, we determined the age-specific population of each zip code.

Our independent measures included demographic variables that were suggested by our review of the literature and were available from the 1990 census. We started with 177 social indicators that included measures primarily from six different domains: race and ethnicity; marital status; education; employment; income or poverty status; and housing. For some of these domains, race- or ethnicity-specific data were also included for each of three racial and ethnic groups—black, Hispanic and non-Hispanic white (e.g., the non-Hispanic white birthrate or the proportion of black families living below poverty level)—and gender-specific data were included for each gender (e.g., female and male unemployment rates). For a few demographic characteristics, data were included for ethnicity and gender simultaneously (e.g., proportion of Hispanic females unemployed).*

Because of the large number of potential variables in the data set, we selected three measures of race or ethnicity (the percentage black, the percentage Hispanic and the percentage non-Hispanic white) and conducted a factor analysis of the five remaining domains. We then selected 16 measures to represent these five domains. All 16 variables loaded highly on the most important factors determined by the factor analyses; some had the highest factor loadings, while others had slightly lower loadings but had greater conceptual importance.

Statistical Analysis

We first calculated simple bivariate correlation and regression coefficients between each of the 19 measures and young-teenage birthrate. The correlation and regression coefficients reflect not only the bivariate causal relationships between young-teenage birthrate and each of the 19 measures, but also the causal relationships among other community characteristics that are related both to the young-

*Data were obtained from the Improved Perinatal Outcome Data Management database (Gould JB, Mahajan N and Lucero M, Improving perinatal outcome through data management: the design of a small area analysis system, *Journal of Perinatal Medicine,* 1988, 16(4):305–314) and Improved Perinatal Outcome Data Reports, <http://datamch.berkeley.edu/>, which in turn was based upon the 1990 census files.

teenage birthrate and to the community characteristic in the bivariate analysis. Thus, for example, the correlation between the proportion of the population living below poverty level and young-teenage birthrate reflects not only the causal relationship between poverty and young-teenage birthrate, but also the causal relationships among all the community characteristics that are related to both poverty and young-teenage birthrate (e.g., educational level and unemployment). It may therefore reflect the correlation between poverty broadly defined and birthrate.

To estimate more accurately the unique contribution of economic poverty and the other 18 community measures upon birthrates, we conducted a regression involving the overall birthrate for young teenagers on all 19 measures. In these analyses, issues of multicolinearity quickly arose; accordingly, we set the statistical probability necessary for entering any multivariate model at .01 and tolerance at .20. Even with tolerance set at .20, model stability remained an issue. Thus, in the model presented here, only the regression coefficients that are reasonably large should be given serious consideration, regardless of their statistical significance.

We then regressed the birthrates of the three racial and ethnic groups upon the eight community measures for which we had race-specific and ethnicity-specific data (high school education, college education, male and female employment, male and female unemployment, female participation in the armed services and the percentage of the population living below the poverty level). In these models, multicolinearity was less of an issue; the statistical probability necessary for entering any multivariate model was left at .01, and the default option for tolerance was used. (It did not affect the entry of variables into the model.)

Because zip codes had greatly varying numbers of young female adolescents within them and because birthrates within individual zip codes with very small numbers of teenagers sometimes fluctuated wildly from year to year, we included only those zip codes that had at least 200 young women aged 15–17 across the six years and weighted each zip code according to the number of young teenagers within it. These weights were normalized so that the effective sample size remained the same. Results indicated that restricting the zip codes to at least 200 teenagers and normalizing the data increased the stability of the models.

Results

Community Characteristics

All measures in the regression analysis—the three measures of ethnicity and the 16 measures identified by the factor analysis—are listed in Table 1. The mean young-teenage birthrate was 43 births per 1,000 15–17-year-old females, varying across zip codes from zero to 241 per 1,000. According to the means of these zip codes, approximately 13% of households were below poverty level and 11% received welfare during this time period. The households had a median annual income of about $36,000.

Roughly 28% of adults 25 or older had a college education. Among males 16 or older, 69% were employed and 6% unemployed. The rest were either in the armed services or not in the labor force (e.g., students, homemakers, seasonal workers, disabled persons, persons discouraged from looking for work or retired workers). Among females aged 16 or older, 52% were employed and 4% unemployed, while nearly all the rest were not in the labor force. Sixty-five percent of women aged 15–25 had never been married. The range in birthrates and the standard deviations of the other community measures show, not surprisingly, that there is considerable variation across these California zip codes.

Bivariate and Multivariate Relationships

The bivariate correlations in Table 1 show that a single variable, the proportion of households living below the poverty line, is highly related to the young-teenage birthrate (r=.80, p<.001). Two other direct measures of poverty, median household income and the proportion of households receiving public assistance, are also highly related (r=–.72, p<.001 and r=.75, p<.001, respectively). With the important exception of male and female unemployment, three of the four measures of poverty (or wealth) have the largest regression coefficients.

While these results are based upon narrow measures of poverty, they capture the shared explanatory power of many of the community characteristics with which they are correlated, and thus measure the impact of poverty much more broadly defined. More specifically, the proportion of households living below the poverty line is significantly related (at p=.001) to the following community characteristics (not shown): the proportion of adults with a college degree (r=–.68), male employment (r=–.53), male unemployment (r=.83), female employment (r=–.72), female unemployment (r=.74), the proportion white, non-Hispanic (r=–.71), the proportion black (r=.41), the proportion Hispanic (r=.65), the proportion never-married (r=.55), the proportion divorced (r=.18), the proportion of owner-occupied housing with more than one person per room (r=.65) and the proportion of renter-occupied housing with more than one person per room (r=.73).

Table 2. Results from stepwise regression analyses predicting young-teenage birthrates with selected zip code characteristics (N=1,192)

Characteristic	R^2 change*	b	SE	p
% of population living below poverty level	.644	1.54	.086	.000
% with college degree	.077	–0.80	.051	.000
% of females employed	.013	0.22	.090	.016
% of males employed	.002	0.19	.066	.005
% of females aged 15–25 who were never married	.005	–0.18	.046	.000
% black	.002	0.13	.036	.000
% Hispanic	.002	0.09	.029	.001

*Based upon entry into the model using stepwise regression. *Notes:* All analyses are weighted by the number of females aged 15–17 in each zip code during the period 1991–1996, such that the total N remained 1,192. R^2=multiple correlation coefficient. b=unstandardized regression coefficient. SE=standard error. p=probability value.

Some of these community measures are in turn highly correlated with the young-teenage birthrate (Table 1). For example, for three measures, the absolute values of the correlations with the young-teenage birthrate exceed .70: the proportion of the population with a college degree (r=–.75), the proportion of males unemployed (r=.75) and the proportion of rented housing units with more than one person per room (r=.71). In addition, the proportions of males and of females unemployed had large regression coefficients (b=7.81 and b=8.96, respectively). Thus, the bivariate correlation between the proportion of households living below the poverty line and young-teenage birthrate is also capturing part of the effect of these other variables with which it is significantly correlated and which are considered part of poverty broadly defined.

The stepwise regression results in Table 2 provide a much more accurate picture of the relative importance of different community measures when they are all considered in the same model. Of the seven measures that entered the equation, the proportion of the population living below poverty had by far the largest regression coefficient (b=1.54). Notably, the amount of variance in the young-teenage birthrate that is explained by the proportion of households below the poverty line (r^2=.64) is not much smaller than the

Table 3. Results from stepwise regression analyses predicting young-teenage birthrates with selected zip code characteristics for each racial and ethnic group, by racial and ethnic group

Characteristic	b	SE	p
Black (N=300)			
% living below poverty level	1.06	0.21	.000
% with college degree	–1.12	0.36	.002
% of males employed	0.16	0.42	.705
% of males unemployed	–0.98	1.50	.514
% of females unemployed	4.08	1.61	.012
% black	–0.16	0.05	.003
Hispanic (N=780)			
% living below poverty level	1.36	0.12	.000
% with college degree	–2.98	0.30	.000
% of males employed	1.53	0.22	.000
% of males unemployed	1.33	1.08	.219
% of females unemployed	–1.93	1.10	.078
% Hispanic	–0.36	0.04	.000
Non-Hispanic white (N=1,042)			
% living below poverty level	0.82	0.11	.000
% with college degree	–0.53	0.04	.000
% of males employed	–0.31	0.10	.001
% of males unemployed	2.42	0.79	.002
% of females unemployed	2.96	0.93	.001
% non-Hispanic white	–0.16	0.18	.000

Notes: All analyses are weighted by the number of females aged 15–17 in each zip code during the 1991–1996 time period, such that the total N remained the same. b=unstandardized regression coefficient. SE=standard error. p=probability value.

amount of variance explained by the final model, the sum of the r^2 values for the measures in the equation (multiple r^2=.75).

The proportion of the adult population with a college degree (b=–.80) was the variable with the second largest regression coefficient. Such coefficients can be interpreted as follows: For every 1% increase in the proportion of the population living below poverty level, the birthrate increased by 1.54 births per 1,000 15–17-year-old females, and for every 1% increase in the proportion of the population with a college degree, the young-teenage birthrate decreased by 0.8 births per 1,000. The remaining regression coefficients in the model varied somewhat when changes were made in the model (e.g., when the tolerance parameter for entry of variables into the model was changed). Thus, they should be viewed cautiously.

Somewhat surprisingly, after controlling for the effects of poverty and college education, we found that neither male nor female unemployment entered the equation, despite their highly significant and large regression coefficients in the bivariate analyses. This reflects the high degree of intercorrelation among education, unemployment and poverty. On the other hand, male and female employment both entered the model, but had relatively small regression coefficients.

After controlling for the effects of both poverty and college education, we also found that the proportions of the population who were black and Hispanic were significantly related to young-teenage birthrates. However, their regression coefficients also were quite small in comparison with the coefficients for poverty and college education (b=.13 and b=.09, respectively).

Of the eight community variables that measured race-specific and ethnicity-specific characteristics of the communities, only six entered the equations in one or more of the three racial and ethnic groups when stepwise regression was used (Table 3). To facilitate comparison across the three different racial and ethnic groups, we forced the appropriate ethnic-specific versions of all six measures into all three ethnic-specific models. (The significant results were similar, regardless of whether the nonsignificant measures were also included in the model.)

There were both similarities and large differences across racial and ethnic groups. In all three groups, both poverty and college education were significantly and substantively related to young-teenage birthrate. However, the effects of college education were dramatically greater for the Hispanic population (b=–2.98) than for the non-Hispanic white population (b=–0.53); results for the black population were midway between these (b=–1.12).

The differences among the three groups were most pronounced in the measures of employment and unemployment. Within the non-Hispanic white population, both male and female unemployment were highly and positively related to young-teenage birthrate (b=2.42 and b=2.96, respectively). Consistent with this, male employment was negatively related to birthrate (b=–0.31). (Note that some males were not in the labor force.)

Within the black population, female unemployment was even more highly related to young-teenage birthrate (b=4.08), but neither male employment nor male unemployment were significantly related to birthrate.

Finally, among Hispanics, neither male unemployment nor female unemployment were significantly related to young-teenage birthrate. The relationship between female unemployment and young-teenage birthrate was almost statistically significant (p=.078), but it was in the opposite direction from that of non-Hispanic whites (b=–1.93). Furthermore, male employment was significant and in the opposite direction from what was seen among non-Hispanic whites (b=1.53; p=.000). These results strongly suggest that employment and unemployment may have quite different meanings and effects among different ethnic groups.

Finally, it should be noted that for all three racial and ethnic groups, the larger the proportion of the zip code that was of a given racial or ethnic group, the lower young-teenage birthrate was for that racial or ethnic group, after we controlled for the effects of other community measures. That is, a higher proportion of white residents was associated with a lower white teenage birthrate, a higher proportion of black residents was associated with a lower black teenage birthrate and a higher proportion of Hispanic residents was associated with a lower Hispanic birthrate. Although these regression coefficients were always the smallest, they were all statistically significant. Furthermore, they had relatively large standard deviations, thereby allowing them to play a greater role in affecting young-teenage birthrates than the regression coefficients alone might suggest.

Discussion

The important role of poverty in this study is consistent with studies both of communities and of individual youths and their families. Multiple studies have revealed that family income is related to either pregnancy or childbearing.[18] The simple bivariate correlation and regression coefficients provide measures of the impact of poverty broadly defined to include not just low income, but also other community characteristics sometimes associated with community poverty. What is most striking about these coefficients, particularly the correlation coefficient, is their magnitude. Although correlations are often larger in studies using aggregated data (e.g., zip code data), correlations of this magnitude are relatively rare in social science research, especially when sample sizes are so large.

The multiple regression results provide a much more accurate picture of the impact of low income (as distinct from other measured community characteristics associated with low incomes), and even these show that low income had a greater impact upon young-teenage birthrate than any of the other community characteristics measured. And finally, the impact of poverty diminished slightly, but nevertheless remained, after race and ethnicity were controlled in the race- and ethnicity-specific analyses. Results indicate that in terms of young-teenage birthrates, poverty may play a larger role within the

black population and especially within the Hispanic population than within the non-Hispanic white population.

Of course, this study did not and could not include measures of other zip code attributes that may be highly related to poverty and that may also affect young-teenage birthrates (such as measures of employment opportunity, community norms, quality of schools or family dysfunction). If these attributes had been measured and included in these analyses, it is likely that they would have reduced the effect of family income. After all, it is not just the effect of family income but the effect of multiple qualities of low-income communities and low-income families that affect adolescent birthrates.

The large correlation between poverty and young-teenage birthrate not only helps us understand the causes of adolescent pregnancy, it also helps us predict which zip codes are likely to have high birthrates. This predictive ability is important when trying to allocate scarce pregnancy prevention resources to multiple communities. If recent data on birthrates are not available to program planners, measures of poverty can provide a second-best indicator of need, especially if poverty is combined with a measure of college education.

College education also consistently appeared to have an impact. It had the second largest regression coefficient in the model including all racial and ethnic groups; it also consistently had a significant and substantive impact for each of the three racial and ethnic groups. However, these data suggest that the impact is greatest for the Hispanic population and least important for non-Hispanic whites. As with poverty, multiple studies using youth as the unit of analysis have demonstrated that paternal and especially maternal education have an important impact upon pregnancy and childbearing.[19]

The results for all groups combined demonstrate that after educational level, poverty, employment and other community characteristics are controlled, race and ethnicity have statistically significant, but very small, effects upon adolescent birthrates. This, too, is consistent with studies of individual youths.[20]

Within each of the three ethnic-specific analyses, the larger proportion of the zip code that is of a particular ethnic group, the lower the birthrate of that ethnic group. Although these regression coefficients were not large, they were consistent across all three groups and are also consistent with studies showing that less poverty and greater ethnic homogeneity are associated with less social disorganization and deviancy.[21]

The differences across racial and ethnic groups in the impact of employment and unemployment are another striking finding. First, as is noted above, female unemployment was highly related to young-teenage birthrates for both the non-Hispanic white and black populations. This is consistent with theories of the impact of economic opportunity upon birthrates. For example, the results suggest that when youth perceive that they have few career or employment opportunities, they will also perceive the lost-opportunity costs of having a child at an early age to be smaller and will therefore be more likely to engage in unprotected sex. However, it should also be noted that the relationship between female unemployment and young-teenage birthrate was not significant (and even in the opposite direction) within the Hispanic population.

Second, male employment was negatively related to young-teenage birthrate among the non-Hispanic white group, but was positively related to young-teenage birthrate within the Hispanic population. This finding for Hispanics is inconsistent with theories of the impact of economic opportunity. We thoroughly examined the latter finding among the Hispanic group by examining scatter plots, eliminating outliers and controlling for other variables, but the results remained remarkably stable.

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There are several possible explanations for this finding. First, during the 1990s, there was a large influx into California of Mexican immigrants, many legal, some not. Furthermore, many had permanent jobs, but others had seasonal or nonstandard jobs without official employers. These qualities of their employment may have affected the measurement of employment within the Hispanic population in ways unknown to us.

Second, in Hispanic communities with high unemployment, males may not have stable jobs, may be more transient and may not form stable relationships with young teenagers. Given that having a boyfriend, particularly an older boyfriend, increases the chances that young Hispanic women will have sex,[22] unemployment, greater transience and fewer older boyfriends may lessen levels of pregnancy among Hispanic adolescent females.

Third, acculturation into California culture by Hispanic people may have an impact upon employment, initiation of sex, contraceptive use and acceptance of early childbearing in ways that produce spurious relations between employment and young-teenage childbearing and that we do not fully understand.

Finally, after adjustments are made for poverty, it may be that both fathers and mothers who are not in the labor force have more time to spend with their children and to monitor their activities. Multiple studies have found that both connectedness to parents and parental monitoring reduce teenage sexual risk-taking and pregnancy.[23]

Study Limitations

The actual relationship between young-teenage birthrate and poverty, education or—for that matter—any of the other measures in the model may be even higher than these results indicate, for at least two reasons. First, neither birthrates nor poverty nor educational level nor other community characteristics are measured perfectly. For example, as part of a different study, we examined intensively a few of the zip codes that were outliers (i.e., had birthrates much lower than predicted by poverty) and discovered that some births to adolescents were misallocated to the wrong zip codes on birth certificates, because some teenage mothers provided mailing addresses at post office boxes that had different zip codes from their residential addresses.[24] While we do not believe that such errors were widespread, to the extent that they occurred they would reduce the explanatory power of these models.

Another source of measurement error involved the timing of the variables: Annual birthrates from 1991 to 1996 were used in the dependent variable, but all of the independent variables were based upon 1990 data—none were updated for subsequent years.

The second reason that young-teenage birthrates may have been even more

strongly associated with community poverty, education and other community measures than revealed in this study is that zip codes, which are the unit of analysis in this study, typically do not coincide with actual communities. Sometimes zip codes are smaller than communities; much more often they include multiple communities. And their boundaries nearly always fail to coincide with any community boundaries that might be defined by the residents within them. Thus, while these zip codes describe aggregates of youth and the areas in which they live, they do not describe actual communities that may affect the sexual decision-making of youth. For these two reasons, the estimates we found should be considered conservative estimates.

Another limitation of this study involves issues of multicolinearity, even though we examined them and tried to control for them. Many of the community characteristics were related both to one another and to young-teenage birthrate, and the regression coefficients for these community characteristics changed, sometimes dramatically, when additional community measures entered the model. For example (as we noted earlier), in the analyses for all three racial and ethnic groups combined, the simple bivariate regression coefficients suggested that both male and female unemployment had a large impact upon young-teenage birthrate. Yet when poverty and educational level were statistically controlled, neither male nor female unemployment remained significant, in part because they were so highly related to educational level and poverty. One should not conclude that unemployment and employment opportunities have no impact upon young-teenage birthrates—their impact may simply be captured by measures of poverty.

Finally, we must acknowledge that this article examines aggregate data (i.e., zip codes), and that relationships found among aggregated units of analysis may differ from those found among individuals. However, this is likely to be a relatively minor problem, in part because studies of individuals or mixed studies of individuals and census tracts combined confirm some of these relationships.

It is also true that this study was limited by the fact that it could only examine zip code data and not zip code–level data, family-level data and individual-level data combined. Studies of mixed models in which community-level data are combined with family-level data and individual-level data can separate the effects of community, family and individual characteristics and provide greater explanatory power.

Conclusions

This article supports both methodological and substantive conclusions. Regarding methodological conclusions, this analysis indicates that there is considerable potential for using the analysis of zip-code (or even census-tract) data to further understand the impact of community variables upon adolescent birthrates. After all, more recent birthrate data can now be obtained, new (and more reliable) census data will shortly be available and birthrate data can now be obtained from multiple states, not just from California. And, of course, there is a large body of sociological literature on the interaction among ethnicity, acculturation, education and poverty that can be more fully explored.

Our research also supports four substantive conclusions. First, community poverty, regardless of whether it is defined broadly to include many community characteristics commonly associated with poverty or more narrowly to control for some (but not all) of these characteristics, is highly related to young-teenage birthrates. Undoubtedly, one of the reasons that poverty explains so much of the variation in young-teenage birthrates is that poverty, especially when broadly defined, is a multidimensional phenomenon. For example, zip codes with high rates of poverty probably are more likely to also have higher proportions of single-parent families and of mothers who first gave birth as teenagers, higher rates of substance use, poorer schools, less attachment to school, higher dropout rates, lower levels of education among adults, fewer economic opportunities and higher rates of crime. All of these individual and family characteristics have been found to be related to some measure of sexual risk behavior or childbearing.[25] Thus, the variable (the proportion of families living below the poverty level) taps much more than simple economic purchasing power; it is a manifestation of social disorganization and lack of opportunity existing in the families and schools, as well as the community at large.

Second, the proportion of the community with a college education is less highly related, but nevertheless strongly related to young-teenage birthrate. Third, after controlling for poverty and college education, race and ethnicity are only weakly related to young teenage childbearing. Fourth, the impact of employment and unemployment upon young teenage birthrates may vary greatly among racial and ethnic groups.

Because poverty is so highly related to young teenage childbearing and because poverty is so difficult to change, it may be tempting to conclude that reducing childbearing in this age-group may be nearly impossible. However, the success of some sex education and HIV education programs in low-income communities indicates that it is possible to reduce sexual risk-taking in these communities.[26] Furthermore, a few programs have addressed some of the manifestations of poverty in communities (e.g., school failure and dropout, attachment to adults and lack of belief in the future) and have significantly decreased either pregnancy rates or birthrates among teenagers.[27] In sum, this combination of results—the very strong relationship between poverty, broadly defined, and high teenage birthrates and the success of a few programs that address manifestations of poverty—demonstrates both the importance of poverty and the possibility of addressing it.

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